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RESEARCH ARTICLE

EFFECTS OF TRANSPORTATION ON ENVIRONMENT.

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Abstract

The development of transportation networkshave played an important role in the development of economic and social activities of the countries. Transport is one of a major consumption of petroleum and oil energy in the world. Transportation networks mostly produces air pollution which is a significant element of global warming through emission of carbon dioxide. Road transportis a major source of productionof greenhouse gases which are suspected tobe linked to bringrespiratory problems and diseases. Other environmental impacts of transport systems areacid rain, noises, and climate changes. The aim of thispaper is to study the environmental impacts of transport and the source of energy which is used on land transportation system on the world.

Introduction:-

The effect of transportation on environment is one of the major issue all over the world which effects direct and indirect on thenature, environment and human life. From other sides, transportation networks are very importantfor the economic, social, political and others human activities. Transportationis the important requirement of human which spread outdirectly with the growth of population, increase of industrial and business activity. Transportation system is one of the major consumption of energy due to it increasingly effects on natural environment and arise environmental problems by producing of CO_2which is the cause of global warming. On the other hand it is impossible to completely avoid the pollution of environment which is polluted by transportation system.Therefore without transportation network it is impossible to be done all the human activities. The world's demand of fuels for transportation has multiplied over the last decades due to fast growth of population, urbanization, global mobility and increasesof economic activities. The global transport sector is responsible for 28% of total final energy demand. The majority of the energyused in transportation is 70% that utilized on the movement of passengers and goods on roads locally, nationally, and across the regions. Transportation weighs heavily on climate, energy security, and environmental considerations, as 95% of transport energy comes from oil-based fuels. Transportationis the cause of other critical challenges due to its supporting role in local and global economies, as well as the implications of increasing transportation on human health and social interactions. The huge and multi-facetedchallenges of a global transportation system deeply rooted in fossil fuels are compounded by the quickly evolving aspirations of a worldwide population. Transport is increasingly on the move and has learned to regard mobility, in particular by motorized modes, as an important component of the modern lifestyle. The ways in which we travel have changed a lot over the last few centuries. Transport has become faster, easier and sometimes cheaper. But the developments in

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technology have not always been good for the environment. Due to it has reflect-able effect on the environment. Which is the collection of different alive creature and multiple materials. About 19.64 pounds of carbon dioxide (CO_2) are produced from burning a gallon of gasoline (petrol) that does not contain ethanol. About 22.38 pounds of CO_2 are produced from burning a gallon of diesel fuel. Source: (EIA U.S Energy Information Administration).

Back groundof Transport and Energy:-

Transportation and environment are two different words which have different meaning. Transportation and environment are different broad individual field of study, but these two different field ofstudy havemutual relation to each other.The global transportation sector will face several exclusive challenges over the next four decades (2010 through 2050). The world population is expected to increase by 2.2 billion, reaching 9.2 billion, with more than two-thirds(2/3), of the population living in cities compared to about half the population of today. In addition, the number of megacities is expected to increase from today's 22 to between 60 and 100 megacities by 2050. From other side, in 2010, the global transportation sectorconsumed about2,200 million tons of oil equivalent Million Tons of Oil Equivalent (MTOE), constituting about 19% of global energy supplies. (See figure-1) about 96% of this amount came from oil, while the rest was from natural gas, biofuels, and electricity. More than 60% of the oil consumed globally (around 51 million barrels per day) goes to the transportation sector. As the figure-1 shows, road transport accounts for the bulk (around 76%) of the transportation energy consumption. The light-duty vehicles (LDVs), including light trucks, light commercial vehicles, and minibuses accounted for about 52%, while trucks, including medium and heavy-duty, accounted for 17%. The remaining share of road transport was covered by full-sized buses 4% and two-three wheelers 3%. Air and marine each accounted for about 10% of total transport energy consumption, while the railways accounted for only 3% .Looking at these shares over a longer period of time, (See figure -2) figure-2 shows that road transport has always dominated the transport sector, followed by aviation and shipping. (Source: WEF, Repowering Transport, 2011). In figureic-1 shows the consumption of transportation energy.

Consumption in 2010 transport energy by source and by mode (total ~2,200 MTOE)

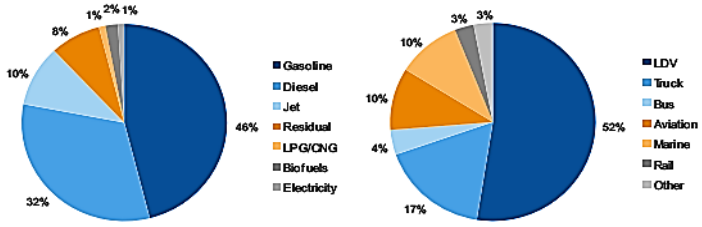

Figure. 1:- Source: WEF, Repowering Transport, 2011.

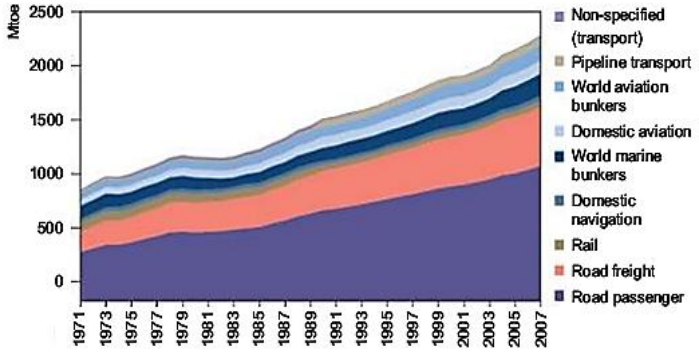

Figure. 2:-shows Global transport final energy use by mode (MTOE).

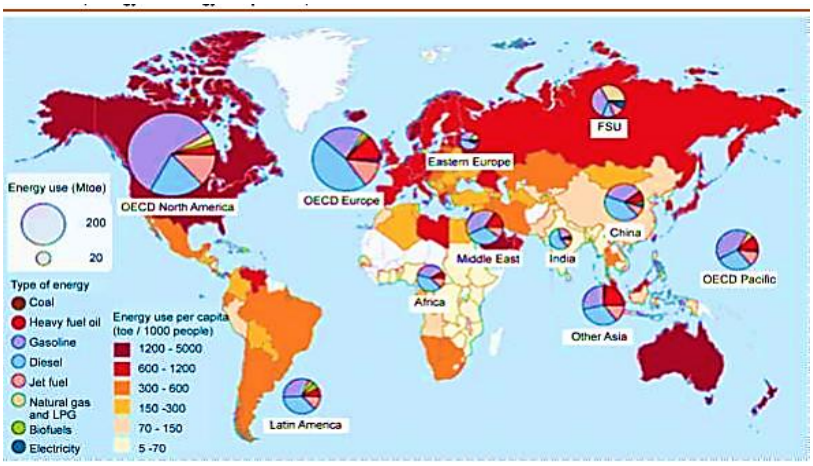

Figure3:-shows Global transport final energy use by region. (IEA, Energy Technology Perspectives, 2010.)

On the other hand (figure-3) shows the consumption of energy by the region the figure reports show the final energy (end use), including the relevant allocation of energy use by international shipping, international aviation and pipeline transport.

Literature Reviewof Transportation and Environment:-

Increasing of energy consumption and carbon production of the transportation sector most attracted recently.The attention of international researchers from the perspective of settlement morphology,**Zhou et al**. argued that reducing transportation energy consumption and CO_2 emission levels can be achieved through appropriate public policies, using Xiamen city as a case study [1].

Rentziou et al. analyzed the issues of passenger transportation vehicle mileage, energy consumption and GHG emissions. They also analyzed the influence of the fuel tax on environmental protection [2].

Akisawa and Kaya explored how to reduce the energy consumption of transportation and minimize the total stroke length under the conditions of continuous congestion; they further set the congestion factor as the endogenous variable and discussed its influence on minimizing fuel consumption [3].

Saidur et al. Analyzed the energy efficiency of the transportation sector in Malaysia; they concluded that road transportation is more efficient than air and ocean transportation [4].

Using lifecycle analysis, **Vanek and Sun** concluded that rail relative to other meansof transportation can better reduce carbon dioxide [5]. This conclusion is similar to the findings of **Song et al.** [6]. It has become a concern to investigate changes in the transportation sector in Shanghai between 2000 and 2010 and the implications of this on transportation energy consumption and energy efficiency. We focus on this. **Lund and Munster** thought that the development of renewable energy and cogeneration technology, e.g., wind energy and biomass, etc., could contribute to the development of the transportation sector by reducing carbon dioxide emissions [7].

Soimakallio et al. studied transportation energy production research in Finland, and their results showed that the competitiveness of the ethanol and biomass fuels used in the production of energy is slightly higher than fossil fuels. Therefore, they asserted that one method of reducing GHG emissions is to use bio-fuel in the transportation sector [8].

Sanchez et al. [9] compared differently powered vehicle using natural gas, biodiesel and diesel buses in Madrid. Meanwhile, they performed an analysis of the selective catalytic reduction system when using biodiesel.

Cristea et al. [10] also conducted an empirical analysis using trade and transportation data. They found that the GHG emissions generated by international transportation accounts for 33% of global trade-related emissions. From the previous research, we find that suitable policies can control the structure of transport, popular density and usage of urban land for reducing energy consumption. Rational vehicle use also decreases

consumption. The scholars also used different calculation methods to analyze energy consumption in the transportation sector and the consequent environmental problems. For example, **Hankey and Marshall** used the Monte Carlo method to study GHG emissions in the process of urban sprawl and development. One-hundred forty-two cities were included in the study (accounting for 56% of the total population of the United States), which explored the impact of six different scenarios. They concluded that in general, vehicle GHG mitigation may involve three types of approaches: more-efficient vehicles, lower-GHG fuels and reduced VKT (vehicle kilometers traveled) [11].

Nearer et al. used the survey data of the U.S. Department of Transportation Bureau of Statistics and the Bureau of Economic Analysis. They analyzed energy consumption and GHG emissions in the trucking sector and proposed an improvement program identified through scenario analysis [12].

Concept of transportation:-

The origin word of transportation is actually derived from the Latin word Trans ("across") and portare ("to carry") Transportare Latin word and transporter old French word. Source (www.businessdictionary.com). The word Transport on (British English) or transportation (American English) is the movement of people and goods from one place to another. The below two definitionsare more common definitions of transport:

- Any device used to move goods or things from one location to another. Common forms of transportation include planes, trains, automobiles and other two wheel devices such as bikes or motorcycles etc.
- The process of delivery or moving an item or goods from Point A to point B.

History of transportation:-

Human history show that the first transport was people's feet. After thatsomebody had created a wheel, a lot of various types of vehicles were developed. At present there are many type of transport which help people to move from one place to another place, to reachevery places in a very short time, with life safety and to overcome seas and oceans and even fly to the stars and to transport huge amounts of goods.People travel in order to reach places that are close or far away, they travel for different purpose may be fun , educations, jobs, health or other social necessity . Travelling takes up more time in our lives than most of us imagine. An everyday form of travelling may be going shopping, commuting to school, to work or visiting friends. There are two ways of travelling, one is using our own means of transport mean private transport and the other is used the public transportation services. People and goods can be transported by land, by air or by water.

Modes of Transport:-

As we know that basically transport is possible through land, air or water, which are called the different modes of transport,but actually I want to point outin this paper the effect of transportation on environment so I have written brief information about the modes of transport too. The modes of transportation broadly divided into the bellow flow chart (See flow chart-4)

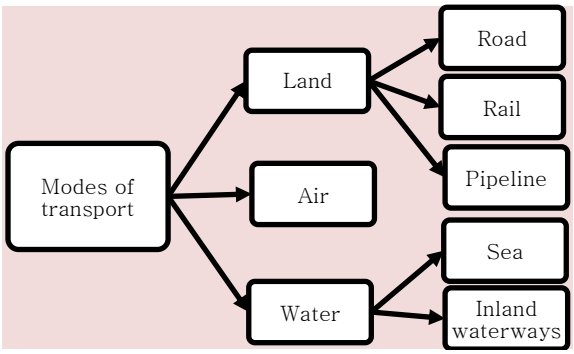

Fig 4:-from Google, showsmodes of transportation

Water transport:-

Water transport is one of the cheapest transport which is used on the seas, and river side places. But on the same time it is dangerous than land transport and it faces more risks. In addition water transport is slow than the other transport that is why rivers, seas, and oceans are continuously being filled with new load and passenger containers. Huge tankers full of goods cruise the seas. In general not many people have the courage to board a ship because

although the journey is inexpensive they can still become sea-sick. For water sports or holidaymaking we use ships, motorboats, surfing, canoes, water ski, sailboats, yachts, etc.

Air transport:-
Moving by air consumes huge sums of money but on the same time it is the fastest way of travelling. An air ticket ensures us a comfortable seat on the plane which can fly us to any place in the world within a few hours. At the airport we go through the passport control and security check. For private use and for some other purposes (health care, army and police needs) helicopters are usually used. Sometimes in the past, balloons and airships cruised the sky. Now, balloon flying is a very romantic sport.

Ground transport:-
Land or ground transport refers to activities of physical movement of goods and passengers on the surface of the land. This movement takes place on road, rail, rope or pipe. So land transport may further be divided into (Road transport, Rail transport, Ropeway transport, Pipe line transport). But now a day the more effected environmental modes of transports are road and under road transport which produced more pollution on the environment. Especially on the urban area where is the more urban modes of transport are used for moving. Road mode of transports are safe and easy accessible mode of transport on the land transportation.

Road Transport:-
Roads are Liner construction that connects one place to another on the surface of the land. You must have seen different roads in your village, towns, cities and state which is made from different materials. Not all of these road look like the same. Some of these roads are made from local materials and some may be made from gravel and concrete, asphalt or coal tar. On the other side you may be find different type of vehicles which moving on roads like animal carts(bulk, donkey or horse), cycles, motorcycles, cars, truck, buses, etc. All of these vehicles don't produced the same amount of pollution. All of these types are different means of road transport. The means of road transport may be divided into three major types.

- **Man driven;**
- **Animal driven; and**
- **Motor driven**

Primary Source of Transportation Energy and Environment Effects:-

The energy which is used on Transportation sector is provide by oil, electricity, heat, gas and coal. But the more useable source of transportation energy is gasoline or diesel. From the change trends of total energy consumption, the transportation energy consumption continues to grow.

Like it is clear that source of energy is very important for the developed of the different sector of the world and whiteout energy resource it is impossible but the consumption of energy is one of the important factor which is more influence on the nature environment which produced a lot of multiple problems. Both consumption of energy and pollution of environment is strong relationship with each other. But from the other side it is impossible to completely avoid from environmental degradation but by use of some technics we can reduced the risk of environmental effects.

The world's total energy consumption is expected to increase at an average annual rate of 1.7% to 2.0% (IEA, 2006; EIA, 2006; WETO-H2). All studies agree that non-OECD energy demand will expand more rapidly than OECD energy demand, especially in non-OECD Asia. The greatest demand increase in energy will be oil based fuels, notably in the transport sector. Both passenger and freight transport are expected to increase, the latter to a greater degree. Worldwide oil consumption is predicted to reach about 118 million barrels per day (mb/d) in 2030 (IEA, 2006; EIA, 2006). Estimates from the European FP6 WETO-H2 project provide lower figures; the world oil consumption will reach 108 mb/d in 2030 and 120 mb/d in 2050. The transport sector will represent 63% of the increase in global oil demand over the period 2004 to 2030 and in non-OECD countries transport will be the biggest contributor to oil demand growth (HOP).Predictors quoted in a report prepared by the Oil Depletion Analysis Centre and the Post Carbon Institute expect global oil production to peak between now and 2020; an increasing number of these forecasters expect peak oil to occur withinthe next five years. The International Energy Agency (IEA) quoted in the same report has forecast that a critical point in global oil supply will be reached by 2012. The report claims that some analysts even believe the peak may already have happened, since global oil production was essentially fat

between early 2005 and mid-2008, despite the soaring oil price (ODAC and PCI, 2008). The peak of oil production highlights the need to develop alternative technologies not dependent on fossil fuels. EU policy considerations regarding energy security, resource depletion and the need to reduce greenhouse gas emissions in the medium and long termmean that a transition to low-CO_2or CO_2 neutral technologies will be required. Action is required urgently to ensure the future of hydrogen technologies in the transport field. This involves further technological research, but also policies to support the introduction of such technology before it can become fully cost competitive (HYNET).

Energy consumption by transportation:-

From 1971 to 2007, global transport energy which is used by transport sector is use rose steadily, with an average growth rate of 2.5%/year, which closely paralleled growth in economic activity around the world. The road transport sector (including both LDVs and trucks) used the most energy and grew most in absolute terms (IEA, 2009b). For passengers, road transport represents the most important mode. The sums of passenger kilometers (p-km) for two and three wheelers, cars, minibuses, and buses are much higher than other modes in every single region of the world. For freight, trucking used about 23% of total energy used by the transport sector in 2005. Data on surface freight movement in many countries is poor, but most freight transport moved by road and rail appears to be domestic rather than international. In the European Union, for example, available data for 2005 indicates that only around 30% of all road freight (in terms of Ton kilometers) crossed an international border. The corresponding figure for rail freight, which accounted for 19% of all surface freight in the same year, was 51%. Travel surveys and fuel use statistics indicate that passenger car travel per capita is approaching saturation 4levels in most OECD countries (Cress well, 2006 ; Dennis and Urry, 2009 ; Millard-Ball and Schipper, 2011), and that distances traveled by each vehicle each year may be declining as the total number of vehicles on the road and levels of congestion increase. Car ownership rates have risen above one LDV for every two people on average in OECD countries, nearly 1.5 vehicles for every two people in the United States, and an increasing number.

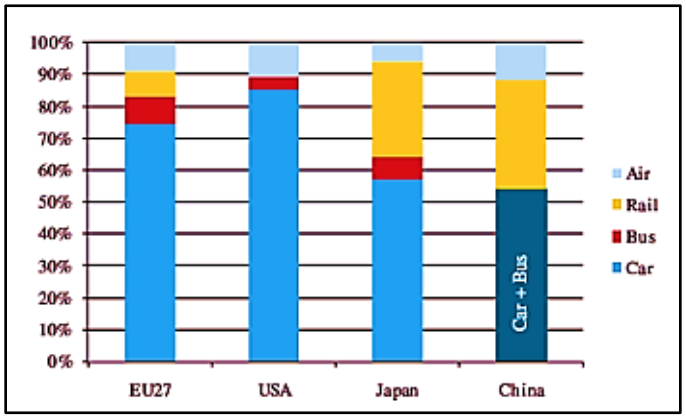

Fig 4:-shows the mode of transport between 4 developed countries

See fig-5 for Comparison between Air, Rail, Bus and Car.

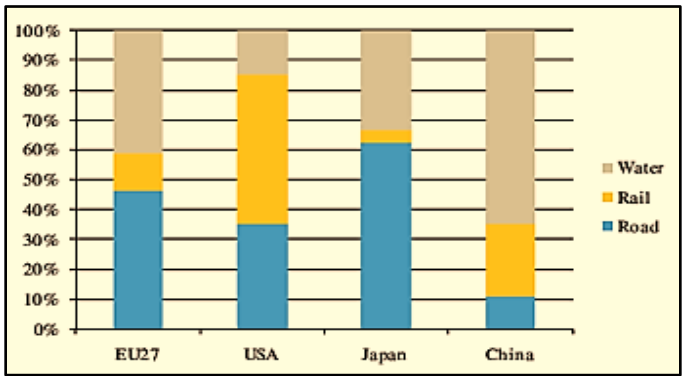

Fig.5:-Models split of passenger (top) and freight transport (bottom; air freight transport not included) in term of passenger Km (P-Km) and t-km, respectively 2005). (**Source based on EU 2010)**

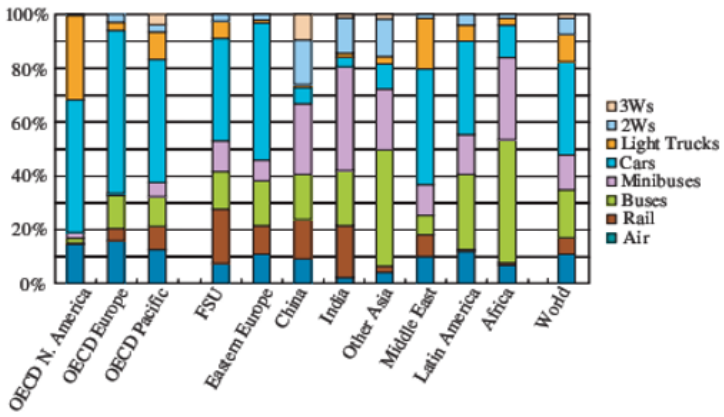

Fig.6:-Estimated motorized passenger travel split by mode (2005). Source: IEA, 2009c. © OECD/ international Energy Agency 2009.

See Table.1-and picture.7.Explain the world transportation energy consumption which is used from 2010 to 2014. World transportation sector delivered energy consumption by Energy source 2010-2014 (quadrillion Btu).

Table 1:-

Years	Other liquids	Electricity	Residual fuel oil	Motor gasoline	Jet fuel	Natural gas
2010	0.41	0.55	8.64	41.38	11.28	2.99
2011	0.50	0.58	9.05	40.80	12.01	3.19
2012	0.53	0.59	9.12	41.06	12.40	3.21
2013	0.55	0.61	8.85	41.31	12.66	3.38
2014	0.59	0.64	8.20	41.84	11.03	3.55
2015	0.63	0.70	7.94	42.49	11.83	3.73
2016	0.66	0.71	7.98	42.50	12.12	3.91
2017	0.68	0.74	8.10	42.69	12.43	4.15
2018	0.70	0.77	8.23	42.90	12.75	4.43
2019	0.72	0.80	8.35	43.12	13.08	4.71
2020	0.73	0.84	8.46	43.29	13.42	4.98
2021	0.74	0.87	8.49	43.41	13.77	5.28
2022	0.74	0.90	8.57	43.52	14.15	5.60
2023	0.75	0.94	8.72	43.64	14.54	5.96
2024	0.75	0.97	8.86	43.77	14.95	6.33
2025	0.76	1.01	9.02	43.91	15.36	6.72
2026	0.76	1.05	9.17	44.05	15.77	7.28
2027	0.77	1.09	9.29	44.21	16.20	7.87
2028	0.77	1.13	9.46	44.42	16.63	8.45
2029	0.77	1.18	9.62	44.64	17.06	8.98
2030	0.77	1.23	9.79	44.88	17.51	9.53
2031	0.77	1.29	9.97	45.17	17.96	10.11
2032	0.78	1.35	10.15	45.50	18.41	10.71
2033	0.79	1.41	10.33	45.92	18.87	11.31
2034	0.81	1.48	10.52	46.41	19.32	11.95
2035	0.82	1.55	10.71	46.96	19.77	12.63
2036	0.84	1.63	10.91	47.57	20.24	13.29
2037	0.85	1.71	11.11	48.19	20.70	14.01
2038	0.87	1.79	11.32	48.83	21.14	14.74
2039	0.89	1.87	11.53	49.48	21.56	15.49
2040	0.91	1.96	11.74	50.12	21.95	16.22

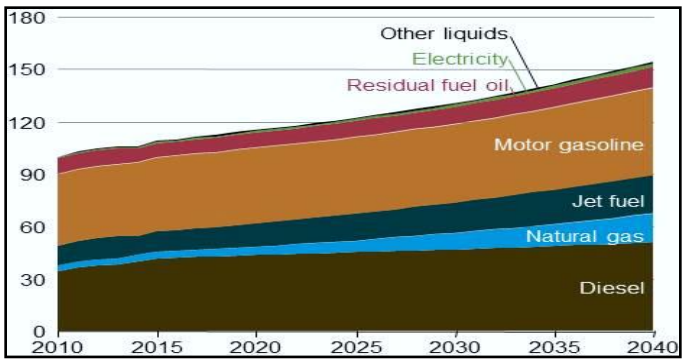

Fig7:- Transport Energy Used on (OECD) countries

Organization for Economic Cooperation and Development (OECD) country is a group of 34 member countries that discuss and develop economic and social policy. OECD members are democratic countries that support free market economies. Transport energy use in OECD and non-OECD countries by mode (others include pipeline and non-specified).

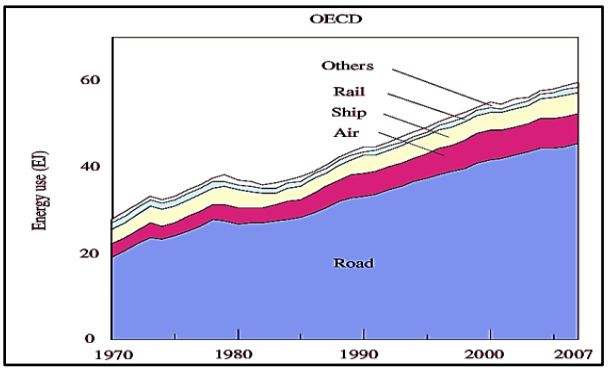

Fig 8:- Source: based on IEA, 2009b.used of energy by modes on OECD countries

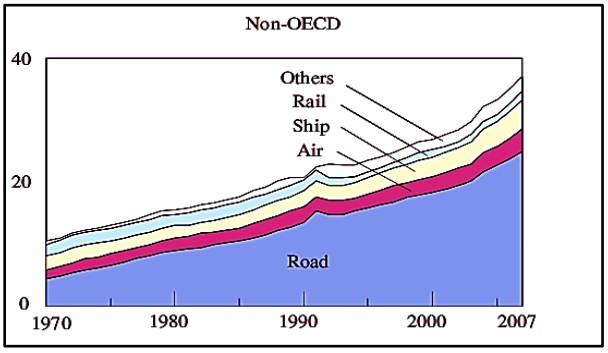

Fig9:- Source: based on IEA, 2009b. used of energy by modes on non OECD countries

Transport, the actual phenomenon of motorization is quite different between OECD and non-OECD countries. Non-OECD countries started later and still show motorization rates significantly below OECD countries. However, the speed of their concurrent urbanization and motorization is unrivalled, especially in China, and puts significant demands on adapting transport infrastructures. A single fossil resource- petroleum- supplies 95% of the total energy used by world transport. This dependence results in two major areas of global concern: the long-term security of energy supplies and the fast rising contribution of the transport sector to greenhouse gas (GHG) emissions (IEA 2009a; Stern, 2007). The carbon dioxide (CO_2) emissions and energy use of different transport sub-sectors are proportional (see Figure 9.). The transport sector has the highest rate of growth in energy use and related CO_2 emissions of all final end-user sectors. Thisrate is expected to increase up to 1.7% a year between 2004 and 2030 (IEA 2009a). 1 In 2007, the global transport sector produced 6.6 $GtCO_2$ emissions, corresponding to 23% of world energy-related CO_2 emissions and, roadtransport, mostly passenger transport, accounts for 73% of this total. A much

higher rate of growth of 3.7%/year (between 1990 –2003) corresponds to freight transport, this trend is expected to continue (see Figure 10) (McKinsey Global Institute, 2009).Use and CO_2 emission in transportsector (2007). Others include pipeline transport and non-specified use.

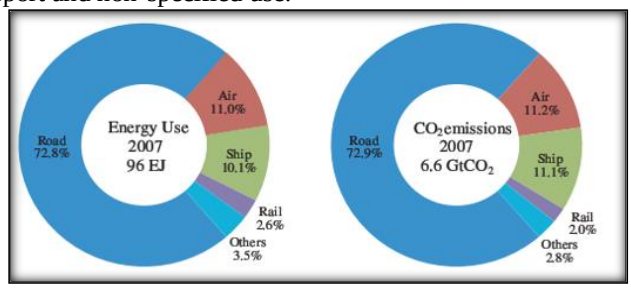

Fig 10:-Source: based on IEA, 2009a; 2009b.

Model share of global energy Urbanization has been extremely rapid in the past 60 years, with a 2.6% annual average growth rate (UN, 2009). More than half of the world now lives in urban areas (UN, 2007; UN, 2008). In 2010, twenty one cities reported having a population over 10 million compared with two cities in 1950 (UNDP, 2010). Rapid growth in suburban areas and the rise of "edge cities" in the outer suburbs has been a common form of development facilitated by the rise of personalized motor transportation. The greater distances replicated through the low-density development discourage walking and bicycling as a share of total travel and are not easily served by public transport (WBCSD, 2002; 2009).

Main environmental problems from transport (taken from **banster et al**., 2000) (See table-2.)

Table 2:-

Resource use	Large amount of oil based resources used for transport.Extraction of infrastructure construction materials
Climate change	Emissions of CO_2 and other global warming gases
Waste	Vehicles, fluids, tire
Air pollution	Locale emissions of Co, PM, lead, VOcs, hydrocarbons and Nox
Noise	Quality of life for those living nearby roads, airports, stations, ports
Land take	Land used for infrastructure ,Habitat fragmentation
Water impacts	Pollution from spillage, Pollution from runoff, Changes to water system by infrastructure.

The Impacts of transport on environment:-

The ways in which we travel have changed a lot over the last few centuries. Transport has become faster, easier and sometimes cheaper. But the developments in technology have not always been good for the environment. Steam trains were indeed faster than wagons, and steam ships faster and stronger than sailing ships. But the smoke they sent into the air polluted the air. Then diesel and electric trains came, and they were somewhat cleaner. However, to make the electricity that trains use; large amounts of coal have to be burned. The smoke also causes air pollution. For details (See figure 11)

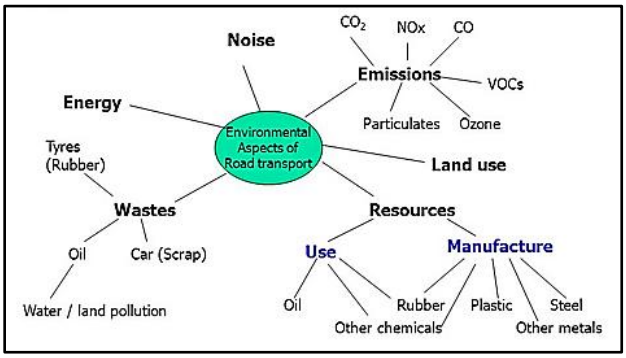

Fig 11:- from Google. Road transport effects on environment

Cars are also bad effects on environment. The exhaust smokes that come from cars contain poisonous gases and pollute the air. The most dangerous gas that comes from cars (and planes) is carbon dioxide (CO2), which is a greenhouse gas. All of the pollution, particularly the greenhouse gases, that is being released into the air is resulting in 'Global Warming'.

In 2011 the European Union used 7 million trucks which transporting 1734 billion T/km goods and itproduced 874.5 million tons CO_2 which is very huge amount of carbon die oxide. Transportation issue of environment is paradoxical in nature. Transportation activities support increasing mobility demands for passengers and moving of things, notably in urban areas. But transport activities have mostly growing levels of motorization and overcrowding. Based on this, the transportation sector is becoming increasingly linked to environmental problems (OECD, 1988). The most important impacts of transport on the environment relate to (climate change, air pollution, producing noise, water pollution, soil pollution, biodiversity and land take. But the six important impacts are climate, noise, health, acidification, land use and ozone damage. The influence transport has in relation to these six main areas is described below.Transportation impacts can fall within three categories:

Direct impacts:-
The immediate consequence of transport activities such as pollutant emissions and respiratory diseases .The cause and effect relationship is generally clear and well understood.

Indirect impacts:-
These are the secondary (or tertiary) effects of transport activities. They are often of higher consequence than direct impacts, but the involved relationships are often misunderstood and difficult to establish, such as congested traffic and stress.

Cumulative impacts:-
These are the additive, multiplicative or synergetic consequences of transport activities. They take into account of the varied effects of direct and indirect impacts on an ecosystem, often unpredicted such as physical Barriers and the migration of exotic species.

Climate change.Climate changing is coming from the increased levels of atmospheric carbon dioxide produced by the use of fossil fuels. Producing of increasing amount of carbon dioxide is arise the temperature of earth which is effect very roughly bad on the natural environment element such as wind, rain, snow, temperature, floods, human life etc. Climate change is one of the great challenges of current society. In the last decades there has come more and more evidence that the emission of greenhouse gas contributes to the effect of global warming. The activities of the transport industry release several million tons of pollutants each year into the atmosphere. These include the emission of lead (Pb), carbonmonoxide (CO), carbon dioxide (CO2), methane (CH4), nitrogen oxides (NOx), nitrous oxide (N_2O), chlorofluorocarbons (CFCs), perfluoric carbons (PFCs), silicon tetra fluoride (SF6), benzene and volatilecomponents (BTX), heavy metals (zinc, chrome, copper and cadmium) and particulate matters (ash, dust). Numerous scientific studies attest that transportation contributes to climate change (Lenzen, Dey and Hamilton, 2003). Concentrations of CO2, CH4 and N_2O from combustion of fuels in vehicles are the main producers of greenhouse gases.

The road transport sector is responsible for 74 percent of global CO_2 emissions, while aviation, shipping and railways account for 12 percent, 10 percent and 4 percent respectively. Particularly the emission of carbon dioxide (CO2) from the burning of fossil fuels is a major contributor. For the transport sector, the greenhouse gas emissions are dominated by the CO_2 emissions from burning fossil fuels. These are strongly related to transport energy use. These greenhouse gases prevent electromagnetic radiation from leaving the Earth's surface and thus contribute to global warming. This is leading to an increase in the average temperature at the Earth's surface, reducing snow cover of Polar Regions, which in turn is contributing to sea level rise and an increase in ocean heat content. Some of these gases also participate in depleting the stratospheric ozone (O_3) layer which naturally screens the Earth's surface from ultraviolet radiation.

Air pollution.Transportation related air pollution causes damages to humans, biosphere, soil, water, buildings and materials. The most important pollutants are the following:

- Particulate matter (PM10, PM2.5).
- Nitrogen oxides (NO_x).

- Sulphur oxide (SO_2).
- Ozone (O_3).
- Volatile organic compounds (VOC).

The emissions of pollutants give rise to health costs, building/material damages, crop losses and costs for further damages for the ecosystem (biosphere, soil, water). Each impact is related to one or more type of pollutants (Maibach, et al. 2008):

Health impacts. Impacts on human health due to the aspiration of fine particles (PM2.5/PM10, other air pollutants). Exhaust emission particles are hereby considered as themost important pollutant. In addition, Ozone (O_3) has impacts on human health. The main health impacts are increased health problems for people who suffer aspiration diseases and a higher risk for anyone to get such a disease.

Building and material damages. Impacts on buildings and materials from air pollutants. Mainly two effects are of importance: soiling of building surfaces/facades primarily through particles and dust. The second, more important impact on facades and materials is the degradation through corrosive processes, due to acid air pollutants like NOx and SO_2.

Crop losses. in agriculture and impacts on the biosphere: crops as well as forests and other ecosystems are damaged by acid deposition, ozone exposition and SO_2.

Impacts on biodiversity andecosystems.(soil and water/groundwater): the impacts on soil and groundwater are mainly caused by eutrophication and acidification due to the deposition of nitrogen oxides, as well as contamination with heavy metals (from tire wear and tear).

The World Health Organization estimates the number of people worldwide that die from outdoor air pollution at 865 thousand per year (WHO, 2007), less than 10% of these in European Union. Other estimates are even much higher. The European Commission estimates the number of premature deaths in Europe alone at 370 thousand per year (EC, 2005). This is rather well in line with an estimate from Pimentel, who estimated the number of deaths globally from outdoor air pollution at about 3 million per year (Cornell Chronicle, 2007).

Greenhouse-gas emissions of the transportsector. The worldwide greenhouse emissions of all sectors together show a steady growth. Despite policy interventions like the Kyoto protocol, this growth tends to continue. However, there are big differences between sectors. Looks to for more details fig 12.

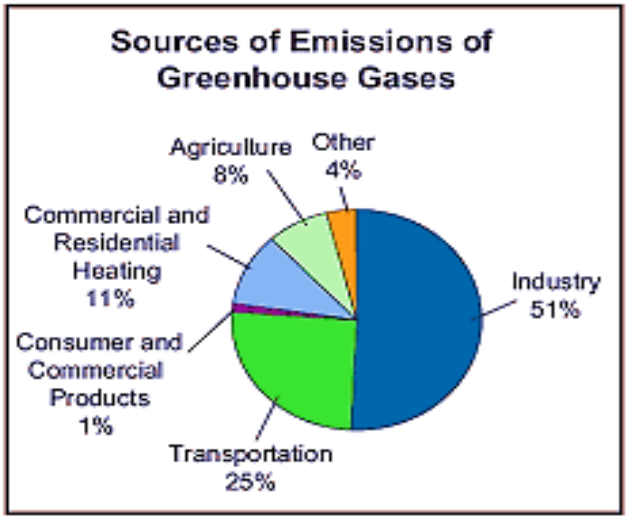

Fig. 12; -From Google production of greenhouse gases

While greenhouse gas emissions of many other sectors stabilized or even decreased over the last decades, the CO_2 emissions of the transport sector keep on growing. Together with the energy sector, transport is the only

sector with still strongly increasing CO_2 emissions.The share of transport increases from about one sixth in the early 1980s to now almost one fourth (23%). In the OECD countries this share is even higher (about 29%, ECMT, 2007).

Air pollution. Highway vehicles, marine engines, locomotives and aircraft are sources of pollution in the form of gas and particulate matter emissions that affect air quality, causing damage to human health (Holmen and Niemeier, 2003). Toxic air pollutants are associated with cancer, cardiovascular, respiratory and neurological diseases. Carbon monoxide (CO) when inhaled affects the bloodstream, reduces the availability ofoxygen and can be extremely harmful to public health. The emission of nitrogen dioxide (NO2) from transportation sources reduces lung function, affects the respiratory immune defense system and increases the risk of respiratory problems. The emissions of sulfur dioxide (SO2) and nitrogen oxides (NOx) in the atmosphere form various acidic compounds that when mixed with cloud water create acid rain. Acid precipitation has detrimental effects on the built environment, reduces agricultural crop yields and causes forest decline (Delucchi, 2003). The reduction of natural visibility by smog has a number of adverse impacts on the quality of life and the attractiveness of tourist sites. Particulate emissions in the form of dust emanating from vehicle exhausts as well as from non-exhaust sources such as vehicle and road abrasion, have an impact on air quality. The physical and chemical properties of particulates are associated with health risks such as respiratory problems, skin irritation, eye inflammation, blood clotting and various types of allergies.

The ways in which we travel have changed a lot over the last few centuries. Transport has become faster, easier and sometimes cheaper. But the developments in technology have not always been good for the environment. Steam trains were indeed faster than wagons, and steam ships faster and stronger than sailing ships. But the smoke they sent into the air polluted the air. Then diesel and electric trains came, and they were somewhat cleaner. However, to make the electricity that trains use; large amounts of coal have to be burned. The smoke also causes air pollution.Cars are also bad for the environment. The exhaust fumes that come from cars contain poisonous gases and pollute the air. The most dangerous gas that comes from cars (and planes) is carbon dioxide (CO_2), which is a greenhouse gas. All of the pollution, particularly the greenhouse gases, that is being released into the air is resulting in 'Global Warming'.

Noise. Noise represents the general effect of irregular, unpleasant and chaotic sounds. It is Traumatizing for the hearing organ and that may affect the quality of life by its unpleasant and disturbing character. Long-term exposure to noise levels above 75 dB seriously hampers hearing and affects human physical and psychological wellbeing (Valcic, 1980). Transport noise emanating from the movement of vehicles and the operations of ports, airports and rail yards affects human health, through an increase in therisk of cardiovascular diseases. Increasing noise levels have a negative impact on the urban environment reflected in falling land values and loss of productive land uses.

Water pollution. Transport activities have an impact on hydrological conditions. Fuel, chemical and other hazardous particulates discarded from aircraft, cars, trucks and trains or from port and airport terminal operations, such as de-icing, can contaminate rivers, lakes, wetlands and oceans. Globally, worldseaborne trade grew from 2.6 billion tons of loaded goods in 1970 to 5.9 billion tons in 2002 (UNCTAD, 2003). Because demand for shipping services is increasing, marine transport emissions represent the most important segment of water quality inventory of the transportation sector. The main effects of marine transport operations on water quality predominantly arise from dredging, waste, ballast waters and oil spills. Dredging is the process of deepening harbor channels by removing sediments from the bed of a body of water. Dredging is essential to create and maintain sufficient water depth for shipping operations and port accessibility. Dredging activities have a two-fold negative impact on the marine environment. They modify the hydrology by creating turbidity that can affect the marine biological diversity. The contaminated sediments and water raised by dredging require spoil disposal sites and decontamination techniques. Waste generated by the operations of vessels at sea or at ports causes serious environmental problems, since it can contain a very high level of bacteria that can be hazardous for public health as well as marine ecosystems when discharged in waters. Besides, various types of garbage containing metals and plastic are not easily biodegradable. They can persist on the sea surface for long periods of time and can be a serious impediment for maritime navigation in inland waterways and at sea, also affecting berthing operations. Ballast waters are required to control ships' stability and draught and to modify their center of gravity in relation to cargo carried and the variance in weight distribution. Ballast waters acquired in a region may contain invasive aquatic species that, when discharged in another region, may thrive in a new marine environment and disrupt the natural marine ecosystem. There are about 100 non-indigenous species recorded in the Baltic Sea. Invasive species have resulted in major changes in near shore

ecosystems, especially in coastal lagoons and inlets (Leppäkoski et al., 2002). Major oil spills from oil cargo vessel accidents are one of the most serious problems of pollution from maritime transport activities. The Erika,Prestige, and Sea Empress oil spills that occurred in the European Atlantic generated a significant amount of pollution that destroyed aquatic species including algae, mollusks, crustaceans, marine mammals, fish and invertebrates (Talley, 2003).

Soil pollution. The environmental impact of transportation on soil consists of soil erosion and soil contamination. Coastal transport facilities have significant impacts on soil erosion. Shipping activities are modifying the scale and scope of wave actions leading to serious damage in confined channels such as river banks. The removal of the Earth's surface for highway construction or lessening surface grades for port and airport developments have led to important loss of fertile and productive soils. Soil contamination can occur through the use of toxic materials by the transport industry. Fuel and oil spills from motor vehicles are washed off road sides and enter the soil. Chemicals used for the preservation of railroad ties may enter into the soil. Hazardous materials and heavy metals have been found in areas contiguous to railroads, ports and airports.

Biodiversity.Transportation also influences natural vegetation. The need for construction materials and the development of land-based transportation has led to deforestation. Many transport routes have required draining land, thus reducing wetland areas and driving out water plant species. The need to maintain road and rail right-of-way or to stabilize slopes along transport facilities has resulted in restricting the growth of certain plants or has produced changes in plants with the introduction of new species different from those which originally grew in the area. Many animal species are becoming extinct as a result of changes in their natural habitats and reduction of ranges.

Land take. Transportation facilities have an impact on the urban landscape. The development of port and airport infrastructure is a significant feature of the urban and per urban built environment. Social and economic cohesion can be severed when new transport facilities such as elevated train and highway structures cut across an existing urban community. Arteries or transport terminals can define urban borders and produce segregation. Major transport facilities can affect the quality of urban life by creating physical barriers, increasing noise levels, generating odors, reducing the urban aesthetic and affecting the built heritage.A comprehensive assessment of the environmental impacts of the transportation system is not restricted to these issues. Additional effects such as accidents and the movement of hazardous materials need to be included. It is also possible to break down the total environmental impact of the transport industry into contribution from downstream and upstream requirements for the provision of transport infrastructures. Another issue is that the scale of the impacts may vary from the local to the global.

Mitigation of environment from transportation pollution:-

Like it is clear that always development of technology is not good for the people duo to development of technology has opposite effect on the environmental some of the important point which is play important role on the mitigation of environmental degradation is written bellow:

1- Avoid using too old transportation vehicle which produces more carbon di oxide.
2- Use best quality of oil and other energy source for the vehicles.
3- Produced renewable energy vehicles by companies.
4- Reduced travel distance of the passengers.
5- Government should make policy to avid from used of more cars and increase tax on private cars and vehicle.
6- Government try to make opportunity for the use of public transport instead of private transport.
7- Government make such a policy to build more and proper roads and transportation infrastructure for the use of people.

Conclusions:-

The most important environmental impacts from the transport sector are caused by emissions of air pollutants, CO_2 and noise. International road and rail freight transport are responsible for a minor, but increasing, share of these transport emissions.

Although it is impossible to protect environment from degradation due to it is effected by many factors but for the transportation we can consider the below directions. From the study of different research finely we received that the producing of carbon dioxide by transport system is one of the opposite effected factors which is mostly effect on the

natural environment and caused of degradation of environment.Producing of carbon dioxide is not only has relationship with consumption of fuels but it is also relation with the quality of the fuels and quality of the engines of vehicle and the network of the road system which is used for the vehicle.To avoid from such problem the best way is used of renewable energy on the vehicle and other transportation system. And improved road network, control of the quality of energy sourcewhich is used on the transportation system. And also control of the old vehicle and number of the vehicle.

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